

JOINT TRANSPORTATION RESEARCH PROGRAM

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Snow and Ice Performance Standards

Introduction

Performance standards have been developed by the Indiana Department of Transportation (INDOT) for most maintenance activities (e.g., mowing, crack sealing, and so forth). These standards provide guidance with regard to the amount of required effort, which correlates with costs. Currently there are three level of service (LOS) standards for winter operations. These LOS standards describe performance from a pavement condition perspective and are subjective. A more appropriate standard is one that utilizes a quantifiable measure, e.g., traffic speeds.

Findings

Storm Impact Period

Data analysis reveals that once a winter event starts there is a time lag of reduced traffic speeds at the start and end of the event. This time interval is called the “storm impact period.” Since this study focused on interstate routes where the posted speed limit is 70 mph, the impact period interval is when speeds are lower than 55 mph. Data analysis also revealed that 27% of storm-related crashes occurred during the storm impact period.

Storm Index

INDOT uses the weather hour approach to define winter severity. A weather hour is defined as an hour that experiences winter precipitation. An individual storm can have different levels of intensity and severity, making the weather hour value inappropriate to use. Several storm indices have been developed and were evaluated. A recommended storm index is described in Table 1.1 of the report.

Performance Standard

After researching various measures for determining snow and ice performance and reviewing the current INDOT mobility standard, vehicle speed was chosen as the performance measure. The researchers then collected speed data during two winter seasons and performed statistical analyses.

During the first winter, 2010–2011, 21 monitoring stations were used. These stations were geographically spaced around Indiana and all were at interstate locations. During this winter there were 25 measureable winter weather events in which traffic speeds were recorded.

For the 2011–2012 winter season the study advisory committee requested that the speed analysis only include Marion County sites. The reason for this was to focus on operations in the Indianapolis metro area and validate the standard. There are six sites in this area, and there were 16 weather events in this area during this winter.

Based upon the data collected during the winter seasons 2010–2011 and 2011–2012, the following winter storm performance standard is proposed for adoption by INDOT.

ADT in vehicles per day (VPD)	% of traffic speeds less than 45 mph during storm impact period
≤65,000	No more than 25
>65,000*	No more than 60

**Exception: During the weekday hours of 6 AM to 6 PM, no more than 40% (example only) of the total traffic speeds are less than 45 mph per storm event.*

Another proposed performance measure is to limit the amount of time during which traffic speeds are less than 45 mph to 30 minutes during a storm impact period.

LOS Grade

Another standard used in transportation agencies to measure performance is an LOS value. This is a subjective scale, but in this case the scale that follows is based on speed values collected over the two-year winter period.

Traffic speed (70 mph posted)	LOS grade
55+	Very good
45–55	Good
35–45	Fair
25–35	Poor
<25	Very poor

Implementation

Implementation will occur at the unit level where snow and ice operations occur. Managers can easily implement and use this standard since it is based on vehicle speeds. It provides immediate feedback to evaluate the effectiveness of winter operations during differing

weather conditions. If this standard proves effective for interstate routes, standards for other route types can be patterned after this one. Operations will be involved in implementation.

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